

Appendix D

Preparation Guide for Operational Safety Procedures

This appendix provides guidance for writing OSPs. An OSP assigns responsibility for safe operations, describes the work to be done, identifies the hazards and environmental concerns, and specifies the controls that must be applied to the operation. An OSP outlines the methods or steps for avoiding, controlling, and minimizing the ES&H hazards and risks identified in SARs and other ES&H evaluations, such as those in Appendix B. In addition (and as applicable), the OSP should describe maintenance and quality assurance of safety-related systems and equipment. The ES&H team and engineering personnel for your area can provide guidance on preparing and processing OSPs.

OSP and their supplements shall follow this guide for their format and content, with modifications only as necessary or appropriate for the particular operation to be described. Editorial instructions are enclosed in brackets ([...]).

Lawrence Livermore National Laboratory
Operational Safety Procedure No. _____
Review level _____ [A, B, or C—see Appendix E]

Effective: _____

Expires: _____

[Title of the operation or experimental activity]

1. Reason for Issue

[OSPs and their supplements are generally issued for one of three reasons: (1) the LLNL *Health & Safety Manual* requires a safety procedure for the proposed operation or it is not covered by the Manual; (2) the required controls specified in the *Health & Safety Manual*, *Environmental Compliance Manual*, or FSP cannot be applied to the operation; or (3) the operation is not within the scope of activities authorized for the facility in which the operation will be conducted. Examples of “Reason for Issue” statements are given below:

- The *Health & Safety Manual* requires a safety procedure for operations that involve the use of fissile materials (e.g., ~1 kg of ^{235}U).
- Operations with short-pulse lasers and laser dyes will be performed. The controls necessary for safe operations are not covered in the *Health & Safety Manual*.
- The FSP limits operations to Class I and II lasers and requires an OSP for Class III or IV lasers. This operation involves the use of a Class IV laser.]

2. Work to be Done and Location of the Activity

[Briefly describe the work to be done (i.e., state *what* is to be done, but not *how* the work will be done).

Identify the building and room number(s) where this operation will take place. If hazardous materials are involved, identify both the work involved and the storage location. If the operation is outside a building or is located offsite, describe the general location.]

3. Responsibilities

[Use the following paragraphs:]

[Name the Responsible Individual with his/her extension] is responsible for the safety of this operation and for assuring that all work is performed in conformance with this OSP, the FSP, and applicable sections of the *Health & Safety Manual* and *Environmental Compliance Manual*. In the absence of [the Responsible Individual], [name the alternate with his/her extension] shall assume these responsibilities.

[NOTE: Due to ES&H liability issues, only LLNL (UC) employees, and in special cases employees of specifically designated government-owned contract-operated (GOCO) organizations, may be “Responsible Individuals” (also called lead experimenters) or alternates. Other restrictions may apply. Contact the Laboratory Counsel’s Office for more information.]

4. Operations; Hazards Analyses and ES&H Controls Integration

Hazards

[The following format provides for listing all ES&H hazards in a single section and for integrating the discussion of their controls into the same section. Existing OSPs formatted with separate sections for health and safety hazards and controls, and environmental hazards and controls, may be used indefinitely for future revisions (i.e., until the Program and the ES&H team agree that a complete rewrite is warranted).]

[The hazards analysis shall address hazardous operations or radioactive materials associated with the work to be performed. This analysis is the basis for writing this OSP.

For routine activities associated with operations covered by this OSP and that are adequately addressed by the *Health & Safety Manual* and/or *Environmental Compliance Manual*, describe the hazards and reference the section(s) from the manuals that addresses the hazard.

Identify the hazards associated with each aspect of the operation and state the potential consequence(s) of each hazard listed. The question to be answered in this section is “If I conducted this operation without any engineered or administrative controls, what might be the potential consequences?” Use Table B-1 in Appendix B as a starting point to identify the hazards and their potential consequences. Be as specific as possible when describing the hazards and quantifying the operating parameters. Provide or reference a list of all hazardous and/or radioactive materials, including the quantities both in use and in storage, and the storage location(s).

An example of a hazards analysis for an analytical x-ray machine might read as follows:

EXAMPLE: The x-ray machine has a tungsten target and will be operated at a maximum of 30 kV and 30 mA. The primary beam produces on the order of 2000 R/min at 10 cm from the tube. The primary beam is completely contained and impinges on a secondary target of yttrium. It is estimated that the exposure rate from the open-beam, 15-kV, fluorescent x rays entering the glove box is about 20 R/min (1200 R/h). The limit for hand exposure is 50 rem/yr.; therefore, an overexposure could occur with a 2.5-min exposure of the hands.

If monitoring of exposure levels is included in the controls, the limits (PELs, TLVs, STELs, etc.) should be discussed in this section. Where a difference exists among Federal OSHA, California OSHA, or the American Conference of Governmental Industrial Hygienist (ACGIH) exposure limits to chemicals and physical agents, the more stringent limit applies.

Contact your ES&H team for assistance with stating the potential consequences of each identified hazard.]

Controls

[Each control should be specific and contain both action and reaction (e.g., if one of the controls for contamination is to “survey the area at the completion of the job,” state what to do if contamination is found). Tables B-1 in Appendix B should be used as a starting point for specifying controls.

The following are examples of controls for the x-ray hazard previously described:

EXAMPLES: The secondary x-ray beam shall be enclosed in an interlocked glove box. Interlocks shall be tested semiannually by the electronics technician supporting the operation.

The health and safety technician shall perform an x-ray survey when the machine is energized for the first time and annually thereafter. If the dose rates exceed 2.5 mrem/h outside the glove box, the health physicist shall be notified.

When addressing the items in Table B-1 (Appendix B), state the limitations of the temperature, pressure, and voltage that are vital to the safe control of the operations. Specify any engineered safety controls and protective equipment that must be operating to prevent injury. If an Engineering Safety Note has been prepared (e.g., for high-pressure apparatus), include a summary of the design parameters that established the system’s limitations; be sure to list the safety note in the reference section.

For hazardous and/or radioactive materials, describe the required controls for shipping, receiving, storing, and using these materials. Specify any protective equipment to be used (e.g., hoods and face shields) and protective clothing to be worn.

Notify the health and safety technician if the location of hazardous chemicals and materials should be changed so that he/she can update the “run cards” used by the Fire Department when responding to an emergency.

Contact your ES&H team for assistance with developing adequate controls for each identified hazard.

Reference the training listed in Section 5 of this appendix as one of the administrative controls for the activity.]

5. Training and Required Reading

[Only applicable training requirements are to be specified in the OSP. Consult the training program plan(s) for the responsible directorate(s), the *LLNL Training Program Manual*, and Chapter 7 of the *Health & Safety Manual* for job-related training requirements.]

[The section on required reading should include FSPs and OSPs, MSDSs, chapters or sections of the *Health & Safety Manual*, and other documents that specifically pertain to an operation.]

6. Maintenance, Inspections, and Quality Assurance

[Identify the safety systems associated with the operation for which failure to provide preventive maintenance could significantly increase the risk of injury, illness, loss or damage of property (including programmatic equipment), or impact on the environment. Examples include interlocks, alarms on temperature sensors, hoods and filters, or scrubbers used in chemical operations. Specify the required maintenance to ensure these protective systems continue to function as designed, and identify the person responsible for conducting the maintenance. Additional guidance is provided in Section 4 of the *LLNL Maintenance Program Guidance Manual*. Refer to existing maintenance plans and programs where they exist. (Use the information developed in Table B-4, Appendix B).]

[For the components and systems identified in Section 4 of the OSP as being critical to ES&H, state the methods for ensuring the quality of these systems (i.e., the schedule of tests, surveys, and inspections that will be performed on components or systems important to safety and environmental protection). Refer to existing, relevant QA plans and procedures or to applicable sections of the FSP. (Use the information developed in Table B-5, Appendix B).]

7. Emergency Response Plans and Procedures

[Describe the response procedures to be implemented in the event of abnormal situations or accidents unique to this operation (e.g., spill of hazardous or radioactive material). If emergency procedures are provided in the FSP and are applicable to the operation, reference the relevant FSP section.

For hazardous operations and processes with significant adverse impacts, a “safe shutdown procedure” shall be developed and posted in appropriate locations (e.g., in control rooms for accelerators, radiation-producing machines, and explosives processing and firing facilities). Safe shutdown procedures may also be required for high-voltage equipment or chemical operations involving significant quantities of toxic or radioactive materials to mitigate serious health risks to operating personnel, other Laboratory employees, and the public. These procedures shall be accessible to emergency response personnel for all operations that may be left unattended.]

8. References

[List the FSP, other OSPs that affect the work location, applicable Engineering Safety Notes, standard operating procedures, etc.]

9. Review and Approval

[Use the following statement, if applicable:]

“This operation is consistent with technical safety requirements or operational safety requirements (as appropriate). It also meets the specified safety limits and limiting conditions of operations in the safety analysis for building [building number and name of facility], dated [specify issue date].”

This OSP was prepared by: [Responsible Individual]

This OSP was reviewed by: [See Appendix E.]

This OSP is approved by: [See Appendix E.]

[The list of signatures to an OSP should be limited to the Responsible Individual; the Hazards Control Team Leader; the Line Manager responsible for the activity; and, if different from the Line Manager, the Facility Manager responsible for the area where the activity will occur. Other reviewers may be noted on record sheets kept with the original documentation.]

Controlled distribution list

Appendices